LIST OF EXHIBITS

NEBRASKA DEPARTMENT OF HEALTH AND HUMAN SERVICES REGULATION AND LICENSURE
DIVISION OF PUBLIC HEALTH ASSURANCE
RADIOACTIVE MATERIALS PROGRAM

APPLICATION FOR RADIOACTIVE MATERIAL LICENSE

INSTRUCTIONS - (Use additional sheets where necessary.)
New or Renewal Application - Complete Items 1. through 15.
Amendment to License - Complete Items 1.a, 3., and 15. And indicate other changes as appropriate.
Retain one copy for your files and submit original application to: Department of Health and Human Services Regulation and Licensure, Division of Public Health Assurance, 301 Centennial Mall South, P.O. Box 95007, Lincoln, NE 68509-5007.
Upon approval of this application, the applicant will receive a Radioactive Material License, issued in accordance with the requirements contained in Nebraska Regulations for the control of Radiation - Ionizing and the Nebraska Radiation Control Act.

1.a Legal Name and Street address of Applicant (Institution, Firm, Person, etc.)

Applicant Name: _____

Address: _____

_____

City, State Zip +4: _____

Telephone #: _____

FAX #: _____

eMail Address: _____

1.b Street address(es) at which Radioactive Material will be used. (If different than 1.a)

(1) Permanent Address: _____

_____

City, State Zip+4: _____

(2) Temporary Job Sites Throughout Nebraska? ☐ Yes ☐ No

2. Department to Use Radioactive Material

_____

Person to Contact: _____

Telephone #: _____

3. This is an application for:

☐ New License

☐ Amendment to License No. _____

☐ Renewal of License No. _____

4. Individual User(s)

☐ Individual users approved by the Licensee's radiation safety committee.

☐ Individual users approved by the Licensee's radiation safety officer.

☐ Individual users satisfy the requirements of 180 NAC 1-003.13

OR

☐ Name and Title of individual(s) who will use or directly supervise use of, Radioactive Materials. Give training and experience in Items 7. And 8.

First Name + Middle Initial	Last Name	Title

5. Radiation Safety Officer (RSO)
(Name and Title of Individual designated as Radiation Safety Officer.

_____

Telephone #: _____

Attach documentation of his/her training and experience as in Items 7. and 8.

Agency Use Only

Date Received Stamp

6. Radioactive Material Data

☐ Type B Broad Scope, 180 NAC 1-003.13A2

☐ Type C Broad Scope, 180 NAC 1-003.13A3

☐ Specific License, Radioactive Material Listed below:

6.a. Element and Mass Number	6.b. Chemical or Physical Form (Make and Model if sealed source)	6.c. Maximum Activity Requested (Expressed as Curies, Millicuries or Microcuries)	6.d. Use of Each Form (If sealed source, also give Make and Model Number of the storage and/or device in which sealed source will be stored and/or used)

7. Training of Individuals in Items 4. and 5.

Name of Individual:

	Formal Course Title	Location and Date(s) of Training	Clock Hours in Lecture or Laboratory
7.a. Radiation Physics and Instrumentation			
7.b. Radiation Protection			
7.c. Mathematics Pertaining to the Use and Measurement of Radioactivity			
7.d. Biological Effects of Radiation			

8. Experience with Radiation of Individuals in Items 4. and 5.

(Actual use of Radioisotopes or Equivalent Experience)

Name of Individual:

Isotope	Maximum Activity	Where Experience Was Gained	Months/Years	Type of Use

9. Radiation Detection Instruments					
Type of Instrument	Manufacturer's Name	Model Number	Number Available	Radiation Detected	Sensitivity Range

10. Calibration of Instruments Listed in Item 9.

☐ a. Calibrated by Service Company	☐ b. Calibrated by Applicant
Name and Address of Service Company and Frequency of Calibration	

11. Personnel Monitoring Devices

(Check and/or complete as appropriate)

Type	Supplier (Service Company)	Exchange Frequency
☐ Film Badge ☐ TLD ☐ DOSL ☐ Other (Specify): _____		☐ Monthly ☐ Quarterly ☐ Other (Specify): _____

Information to be Submitted on Additional Sheets

12. **Facilities and Equipment**

Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Attach an explanatory sketch of the facility.

13. **Radiation Protection Program**

Describe the radiation protection program as appropriate for the material to be used, including: the duties and responsibilities of the Radiation Safety Officer (RSO); control measures; bioassay procedures (if needed); day-to-day general safety instructions to be followed; etc. If the application is for sealed sources also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.

14. **Waste Disposal**

If a commercial waste disposal service is employed, specify the name and address of the company. Otherwise, submit a detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved. If the application is for sealed sources and devices and they will be returned to the manufacturer, so state.

15. CERTIFICATION
(This item must be completed by applicant.)

The applicant and any official executing this document on behalf of the applicant named in Item 1.a., certify that this application is prepared in conformity with the Nebraska Department of Health and Human Services Regulation and Licensure Regulations for the Control of Radiation - Ionizing and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

_____
Applicant Name From Item 1.a.

By: _____ *Date:* _____
Signature

_____
Print Name and Title of certifying official authorized to act on behalf of the applicant

EXHIBIT 1

Form NRH-5A
(Medical/Teletherapy)
REVISED May 27, 2000

NEBRASKA DEPARTMENT OF HEALTH AND HUMAN SERVICES REGULATION AND LICENSURE
DIVISION OF PUBLIC HEALTH ASSURANCE
RADIOACTIVE MATERIALS PROGRAM

APPLICATION FOR RADIOACTIVE MATERIAL LICENSE - Medical or Teletherapy

INSTRUCTIONS - (Use additional sheets where necessary.)
Medical Application - Complete Items 1. through 26.
Teletherapy Application - Complete Items 1. through 26, as applicable and Supplement C.
Retain one copy for your files and submit original application to: Department of Health and Human Services Regulation and Licensure, Division of Public Health Assurance, 301 Centennial Mall South, P.O. Box 95007, Lincoln, NE 68509-5007.
Upon approval of this application, the applicant will receive a Radioactive Material License, issued in accordance with the requirements contained in Nebraska Regulations for the control of Radiation - Ionizing and the Nebraska Radiation Control Act.

1.a Legal Name and Street address of Applicant (Institution, Firm, Hospital, Person, etc.)

Applicant Name: _____

Address: _____

_____

City, State Zip +4: _____

Telephone #: _____

FAX #: _____

eMail Address: _____

1.b Street address(es) at which Radioactive Material will be used. (If different than 1.a)

(1) Permanent

Address: _____

_____

City, State Zip+4: _____

(2) Temporary Job Sites Throughout Nebraska? ☐ Yes ☐ No

2. Person to Contact Regarding this Application

_____

Telephone #: _____

3. This is an application for:

☐ New License

☐ Amendment to License No. _____

☐ Renewal of License No. _____

4. Individual User(s)
(Name and Title of individual(s) who will use or directly supervise use of, Radioactive Materials. Complete NRH-5A, Supplement A and B for each individual listed.)

First Name + Middle Initial	Last Name	Title

5. Radiation Safety Officer (RSO)
(Name and Title of Individual designated as Radiation Safety Officer.

_____

Telephone #: _____

Attach documentation of his/her training and experience as in NRH-5A, Supplement A.)

Agency Use Only

1.a Legal Name and Street address of Applicant (Institution, Firm, Hospital, Person, etc.)	Date Received Stamp

6. Radioactive Material Data

6. Radioactive Material for Medical Use

Radioactive Material Listed In:	Items Desired (X)	Maximum Possession Limits (In millicuries)
Title 180 NAC 1-003.08I for Invitro Studies		
Title 180 NAC 1-007.34A		
Title 180 NAC 1-007.36		
Title 180 NAC 1-007.40		
Title 180 NAC 1-007.44		
Title 180 NAC 1-007.46		
Additional Items		
Xenon-133 as gas or gas in saline for blood flow studies and pulmonary function studies		
Technetium-99m aerosolized DTPA for pulmonary function studies		
High dose rate remote afterloading brachytherapy device		

6.b. Radioactive Material for Uses not Listed in Item 6.a.

6.b.(1) Element and Mass Number	6.b.(2) Chemical or Physical Form (Make and Model if sealed source)	6.b.(3) Maximum Activity Requested (Expressed as Curies, Millicuries, or Microcuries)	6.b.(4) Use of Each Form (If sealed source, also give Make and Model Number of the storage and/or device in which sealed source will be stored and/or used)

Instructions for Items 7. Through 23.

For Items 7. through 23., check the appropriate box(es) and submit a detailed description of all the requested information. Begin each Item on a separate sheet, identifying the Item number and the date of the application in the lower right hand corner of each page.

If you indicate that you will follow an Appendix to the *Guide for Preparation of Applications for Medical Programs 7.0*, do not submit the pages, but specify the revision number and date of the *Guide*.

The Most current *Guide* is: Revision:_____ Date:_____

Instructions for Items 7. Through 23.

For Items 7. through 23., check the appropriate box(es) and submit a detailed description of all the requested information. Begin each Item on a separate sheet, identifying the Item number and the date of the application in the lower right hand corner of each page.
If you indicate that you will follow an Appendix to the *Guide for Preparation of Applications for Medical Programs 7.0*, do not submit the pages, but specify the revision number and date of the *Guide*.
The Most current *Guide* is: Revision:_____ Date:_____

7. Radiation Safety Committee
- ☐ Names and Specialities attached; AND
- ☐ Duties as in Appendix B; OR
  Equivalent Duties attached

8. Training and Experience
- ☐ Supplements A and B attached for each individual user; AND
- ☐ Supplement A attached for RSO

9. Instrumentation
- ☐ Appendix C Form attached; OR
- ☐ List by Name and Model Number

10. Calibration of Instruments

a. Survey Instruments
- ☐ Appendix D Procedures followed; OR
- ☐ Equivalent Procedures attached

AND

b. Dose Calibrator
- ☐ Appendix D Procedures followed; OR
- ☐ Equivalent Procedures attached

11. Facilities and Equipment
- ☐ Description or diagram attached; OR
- ☐ See Supplements C - Teletherapy Requirements

12. Personnel Training Program
- ☐ Description of training attached

13. Procedures for Ordering and Receiving Radioactive Materials
- ☐ Detailed Information Attached

14. Procedures for Safely Opening Packages Containing Radioactive Materials
- ☐ Appendix F Procedures followed; OR
- ☐ Equivalent Procedures attached

15. General Rules for the safe use of Radioactive Material
- ☐ Appendix G Procedures followed; OR
- ☐ Equivalent Procedures attached

16. Emergency Procedures
- ☐ Appendix H Procedures followed; OR
- ☐ Equivalent Procedures attached

17. Area Survey Procedures
- ☐ Appendix I Procedures followed; OR
- ☐ Equivalent Procedures attached

18. Waste Disposal
- ☐ Appendix J Form attached; OR
- ☐ Equivalent Information attached

19. Therapeutic Use of Radiopharmaceuticals
- ☐ Appendix K Procedures followed; OR
- ☐ Equivalent Procedures attached

20. Therapeutic Use of Sealed Sources
- ☐ Detailed Information attached; AND
  - ☐ Appendix L Procedures followed; OR
  - ☐ Equivalent Procedures attached

21. Procedures and Precautions for use of Radioactive Gases (e.g., Xenon-133)
- ☐ Detailed Information attached

22. Procedures and Precautions for Use of Radioactive Material in Animals
- ☐ Detailed Information attached

23. Procedures and Precautions for Use of Radioactive Material Specified in Item 6.b.
- ☐ Detailed Information attached

24. Personnel Monitoring Devices

(Check and/or complete as appropriate)

Type	Supplier/Service Company	Exchange Frequency
24.a. Whole Body ☐ Film Badge ☐ TLD ☐ DOSL ☐ Other: (Specify)		☐ Monthly ☐ Quarterly ☐ Other: (Specify)
24.b. Finger ☐ Film Badge ☐ TLD ☐ Other: (Specify)		☐ Monthly ☐ Quarterly ☐ Other: (Specify)
24.c. Wrist ☐ Film Badge ☐ TLD ☐ Other: (Specify)		☐ Monthly ☐ Quarterly ☐ Other: (Specify)
24d. Other (Specify)		

25. Private Practice Applicants Only

25.a. Hospital Agreeing to accept patients containing Radioactive Material:

Name:_____

Mailing Address:_____

_____

City, State Zip+4:_____

25.b. Attach a copy of the agreement letter signed by the hospital administrator.

25.c. When requesting Therapy Procedures, attach a copy of Radiation Safety Precautions to be taken and list available radiation detection instruments.

26. CERTIFICATION
(This Item must be completed by applicant.)

The applicant and any official executing this document on behalf of the applicant named in Item 1.a., certify that this application is prepared in conformity with the Nebraska Department of Health and Human Services Regulation and Licensure Regulations for the Control of Radiation - Ionizing and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

_____
Applicant Name From Item 1.a.

By: _____ *Date:* _____
Signature

_____
Print Name and Title of certifying official authorized to act on behalf of the applicant

EXHIBIT 2

Form NRH-5A
(Medical Teletherapy
Supplement A

APPLICATION FOR RADIOACTIVE MATERIAL LICENSE
Medical or Teletherapy

SUPPLEMENT A

Training and Experience
Authorized User or Radiation Safety Officer (RSO)

1. Name of Individual	2. Physician who is licensed to dispense drugs in the practice of medicine in Nebraska?
☐ Authorized User ☐ Radiation Safety Officer	☐ YES ☐ NO

3. Certification

3.a. Specialty Board	3.b. Category	3.c. Month and Year Certified

4. Training Received in Basic Radioisotope Handling Techniques

	Location and Dates of Training	Clock Hours in Lecture or Laboratory	Clock Hours of Supervised Laboratory Experience
4.a. Radiation Physics and Instrumentation			
4.b. Radiation Protection			
4.c. Mathematics Pertaining to the Use and Measurement of			
4.d. Biological Effects of Radiation			
4.e. Radiopharmaceutical Chemistry			

5. Experience with Radiation
(Actual Use of Radioisotopes or Equivalent Experience)

Isotope	Maximum Activity	Where Experience Was Gained	Months/Years	Type of Use

APPLICATION FOR RADIOACTIVE MATERIAL LICENSE
Medical or Teletherapy

SUPPLEMENT B

Preceptor Statement

Supplement B must be completed by the applicant physician's preceptor. If more than one preceptor is necessary to document experience, obtain a separate statement from each.

1. Full Name and Street Address of Applicant Physician	
Full Name:	
Address:	
City, State Zip+4	

2. Clinical Training and Experience with Radiation
(Actual Use of Radioisotopes)

Isotope	Conditions Diagnosed or Treated	Number of Cases Involving Personal Participation[1]	Comments[2]
I-125 or I-131	Diagnosis of Thyroid Function		
	Determination of Blood and Blood Plasma Volume		
	Liver Function Studies		
	Fat Absorption Studies		
	Kidney Function Studies		
	In vitro Studies		
Other			
I-125	Detection of Thrombosis		
I-131	Thyroid Imaging		
P-32	Eye Tumor Localization		
Se-75	Pancreas Imaging		
Yb-169	Cisternography		
Xe-133	Blood Flow Studies and Pulmonary Function Studies		
Other			
Tc-99m	Brain Imaging		
	Cardiac Imaging		
	Thyroid Imaging		
	Salivary Gland Imaging		
	Blood Pool Imaging		
	Placenta Localization		
	Liver and Spleen Imaging		
	Lung Imaging		
	Bone Imaging		

2. Clinical Training and Experience with Radiation
(Actual Use of Radioisotopes)

Isotope	Conditions Diagnosed or Treated	Number of Cases Involving Personal Participation[1]	Comments[2]
Other			
P-32 (Soluble)	Treatment of Polycythemia Vera, Leukemia, and Bone Metastases		
P-32 (Colloidal)	Intracavitary Treatment		
I-131	Diagnosis of Thyroid Function		
	Treatment of Hyperthyroidism		
Au-198	Intracavitary Treatment		
Co-60 or Cs-137	Interstitial Treatment		
	Intracavitary Treatment		
I-125 or Ir-192	Interstitial Treatment		
Ra-226	Intracavitary Treatment		
	Interstitial Treatment		
	Superficial Treatment		
Co-60 or Cs-137	Teletherapy Treatment		
Sr-90	Treatment of Eye Disease		
	Radiopharmaceutical Preparation		
Mo-99/Tc-99m	Generator		
Sn-113/In-113m	Generator		
Tc-99m	Reagent Kits		
X-Ray and Accelerator Therapy	Courses of Therapy Treatment		
Other			

[1] Key to column
Personal Participation should consist of:
1. Supervised examination of patients to determine the suitability for radioisotope diagnosis and/or treatment and recommendation for prescribed dosage.
2. Collaboration in dose calibration and actual administration of dose to the patient including calculation of the radiation dose, related measurements, and plotting of data.
3. Adequate period of training to enable physician to manage radioactive patients and follow patients through diagnosis and/or course of treatment.

[2] Additional information or comments may be submitted in duplicate on separate sheets.

3. Dates and Total Number of Hours Received in Clinical Radioisotope Training
(Submit in duplicate on separate sheets)

4. Training and Experience Obtained Under the Supervision of:

Supervisor's Name:

Institution Name:

Address

City, State Zip+4

Radioactive material License Number(s):

5. Preceptor's Verification

Preceptor's Name: _____
(Type or Print)

Preceptor's Name: _____ _____
(Type or Print) *(Date)*

APPLICATION FOR RADIOACTIVE MATERIAL LICENSE
Medical or Teletherapy

SUPPLEMENT C

Requirements Specific to Teletherapy

1. **Facilities and Equipment**
   - ☐ Description and drawing of facilities attached; **AND**
   - ☐ Description of patient viewing and communicating systems attached; **AND**
   - ☐ Description of area safeguards attached

2. **Beam Stops**
   - ☐ Description of stops used to restrict beam orientation attached

3. **Shielding Evaluation**
   - ☐ Evaluation of proposed shielding attached

4. **Operating and Emergency Procedures**
   - ☐ Description of operating procedures attached; **AND**
   - ☐ Copy of emergency procedures attached

5. **Instruction of Personnel**
   - ☐ Training program and schedule in Appendix A followed; **OR**
   - ☐ Description of instruction program for employees attached

6. **Leak Tests of Sealed Sources**
   - ☐ Description of leak test procedures attached

7. **Teletherapy Physicist (Use only if individual fails to meet 007.66J requirements)**
   - ☐ Statement of qualifications of the physicist who will perform teletherapy calibrations attached.

EXHIBIT 4

RESIDENT'S SUPPORT TECHNOLOGY TRAINING TASK LOG

Name: _____

Task	Date Performed	Supervising Technologist's Initials
1. Hot lab.		
a. Log and monitor incoming packages.	__-__-__	_____
b. Elute generator.	__-__-__	_____
c. Measure and record Mo and Al concentrations in eluate.	__-__-__	_____
d. Prepare each radiopharmaceutical kit used. Measure tagging efficiency.	__-__-__	_____
e. Calculate volume of radiopharmaceutical needed for prescribed dosage. Draw and measure dosage.	__-__-__	_____
f. Perform constancy, accuracy, linearity, and geometry tests on dose calibrator.	__-__-__	_____
g.	__-__-__	_____
h.		
2. Camera.		
a. Center photopeak, focus lens and dot.	__-__-__	_____
b. Perform and evaluate extrinsic and intrinsic field uniformity checks.	__-__-__	_____
c. Perform and evaluate spatial resolution checks.	__-__-__	_____
d. Check motion switches for safe operation.	__-__-__	_____
e.	__-__-__	_____
f.		
3. Processor and dark room.		
a. Operate processor.	__-__-__	_____
b. Prepare fresh chemistry.	__-__-__	_____
c. Clean transport and crossover racks.	__-__-__	_____
d. Check safelight.	__-__-__	_____
e.	__-__-__	_____
f.		
4. Safety surveys.		
a. Perform dose rate survey of clinic.	__-__-__	_____
b. Perform removable contamination survey of clinic.	__-__-__	_____
c. Survey and log decayed waste.	__-__-__	_____
d.	__-__-__	_____
e.		

_____

Preceptor

EXHIBIT 5

RESIDENT'S CLINICAL PROCEDURES TRAINING LOG

Name: _____

Clinical Procedure	Date Performed	Supervising Technologist's Initials
Thyroid scan	__-__-__	_____
Thyroid uptake	__-__-__	_____
Lung perfusion scan	__-__-__	_____
Xenon ventilation study	__-__-__	_____
Aerosol ventilation scan	__-__-__	_____
Renal flow scan	__-__-__	_____
Brain scan	__-__-__	_____
Liver/spleen scan	__-__-__	_____
Bone scan	__-__-__	_____
Gastroesophageal study	__-__-__	_____
LeVeen shunt study	__-__-__	_____
Cystogram	__-__-__	_____
Dacryocystogram	__-__-__	_____
Cardiac perfusion scan.	__-__-__	_____
Cardiac stress ventriculogram	__-__-__	_____
Cardiac rest ventriculogram	__-__-__	_____
Gallium scan	__-__-__	_____
_____	__-__-__	_____
_____	__-__-__	_____
_____	__-__-__	_____

_____

Preceptor

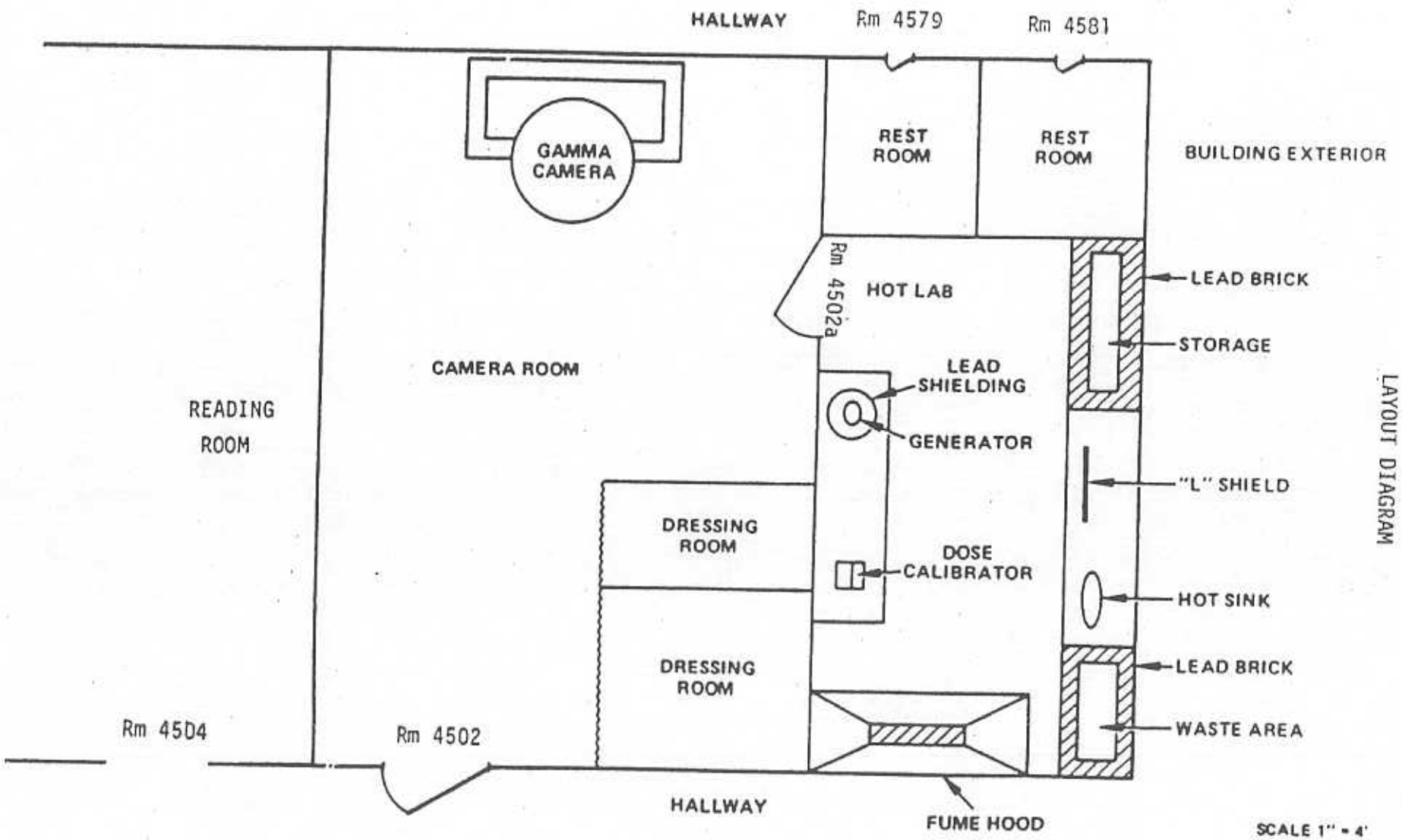


EXHIBIT 6

LAYOUT DIAGRAM

EXAMPLE OF AN ACCEPTABLE TYPE OF LAYOUT DIAGRAM FOR A FACILITY DESCRIPTION INCLUDING SHIELDING PROVISIONS

EXHIBIT 7

Survey Meter Calibration Report

Owner:_____ Department:_____

Manufacturer:_____ Type: o Ion Chamber o GM o NaI(Tl) o _____

Meter model:_____ Meter S/N:_____ Probe model:_____ Probe S/N:_____

Calibration Source: __mCi of _____. ____mR/hr at __in on _____, 19__.

Instrument checks: Battery check:___mR/hr or _____

Constancy check: o integral check source indicates ____mR/hr.

o ___mCi of _____ indicates ____mR/hr.

Calibration Geometry:  o

Window: o open o closed o fixed

dist (feet)	mR/hr today	Scale: Rdng	CorFac	Scale: Rdng	CorFac	Scale: Rdng	CorFac	Scale: Rdng	CorFac

Correction Factors: _____ _____ _____ _____

Name:_____

Date:_____

Calibration Sticker

Cald __-__-__ with _____
// ⊥, window:_____
scale CorFac
_____ _____ bat:"__mR/hr"
_____ _____
_____ _____ chk:"__mR/hr"

EXHIBIT 7 (Example)

Survey Meter Calibration Report

Owner: County General Hosp Department: Nuclear Medicine

Manufacturer: Metrologia Type: ∝ Ion Chamber o GM o NaI(Tl) o _____

Meter model: 101 Meter S/N: 362 Probe model: na Probe S/N: na

Calibration Source: 9.3 mCi of Cs-137. 30.7 mR/hr at 100 cm on June, 19~~86~~.

Instrument checks: Battery check: ~~mR/hr~~ or green line "BATT"

Constancy check: ∝ integral check source indicates 3.2 mR/hr.

o ___ mCi of _____ indicates ___ mR/hr.

Calibration Geometry: ∝ → ▭ → ▭| → |▭ o

Window: o open o closed ∝ fixed

dist (~~feet~~)	mR/hr today	Scale: 1000 Rdng	CorFac	Scale: 100 Rdng	CorFac	Scale: 10 Rdng	CorFac	Scale: Rdng	CorFac
20 cm	767	810	.95						
40	192	190	1.01						
60	85			82	1.04				
100	31			29	1.07				
200	7.7					8.1	.95		
300	3.4					3.6	.94		

Correction Factors: .98 1.06 .94

Name: John Hewitt, RSO

Date: 6-06-86

Calibration Sticker

Cald 6-06-86 with Cs 137

(II) ⊥, window: fixed

scale	CorFac	
1000	1.0	bat: "~~mR/hr~~"
100	1.1	"BATT"
10	.9	chk: "3.2 mR/hr"

EXHIBIT 8

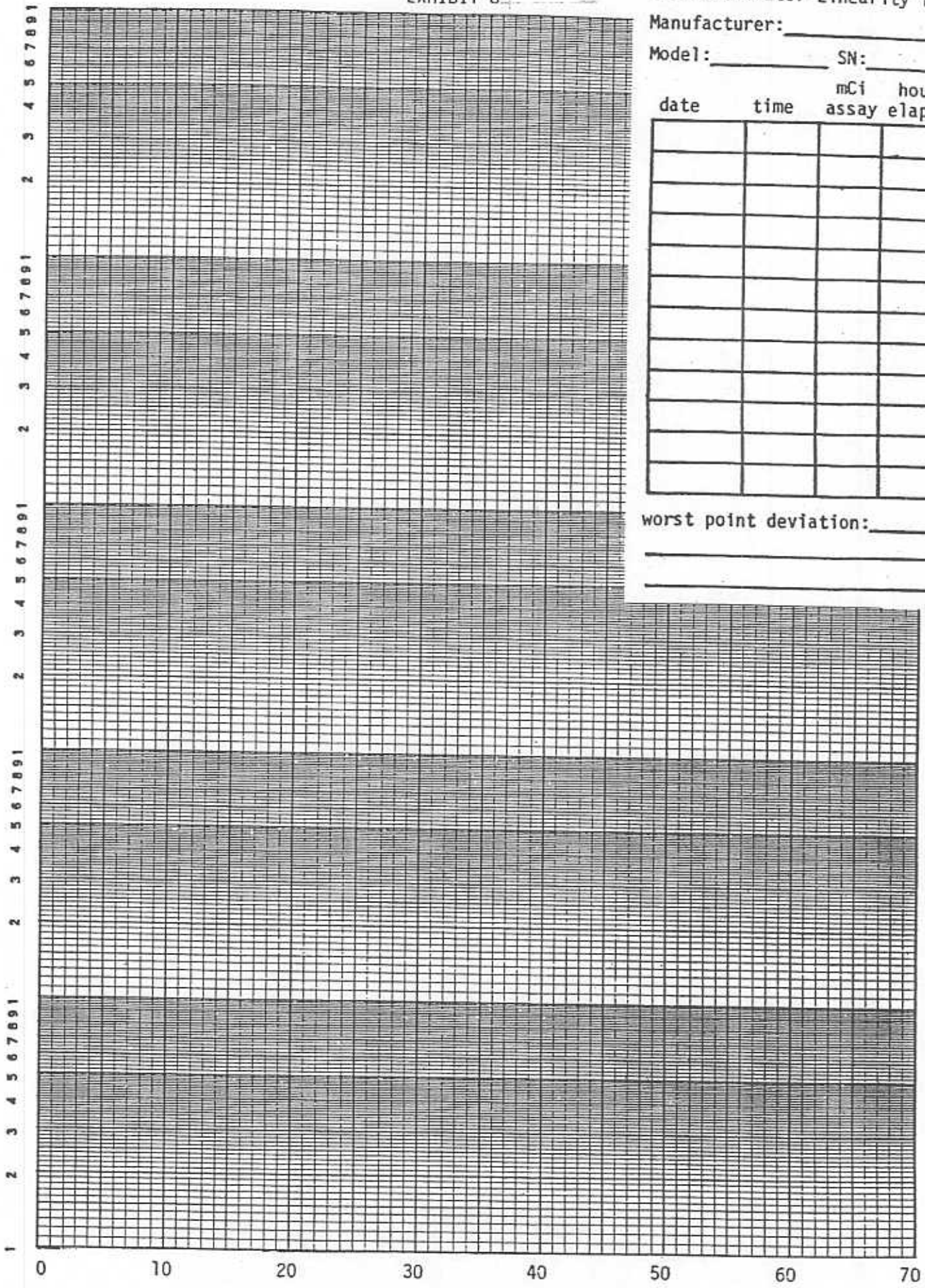
Dose Calibrator Linearity Test

Manufacturer:_____

Model:_____ SN:_____

date	time	mCi assay	hours elapsed

worst point deviation:_____



Dose Calibrator Linearity Test

Manufacturer: *Metrologia*

Model: *DC-3* SN: *352*

date	time	mCi assay	hours elapsed	
3 25 86	7:00 a	35.0	0	
	11:00 a	22.9	4	*
	2:45 p	14.6	7.8	
3 26 86	8:05 a	1.95	25.1	
	11:25 a	1.33	28.4	
	4:40 p	.730	33.7	*
3 27 86	7:05 a	.140	48.1	
	1:05 p	.071	54.1	
	4:35 p	.047	57.6	
3 28 86	7:00 a	.009	72.0	

worst point deviation: *-.04*

Wendy Breeze, Ch. Tech

John Hewitt, RSO

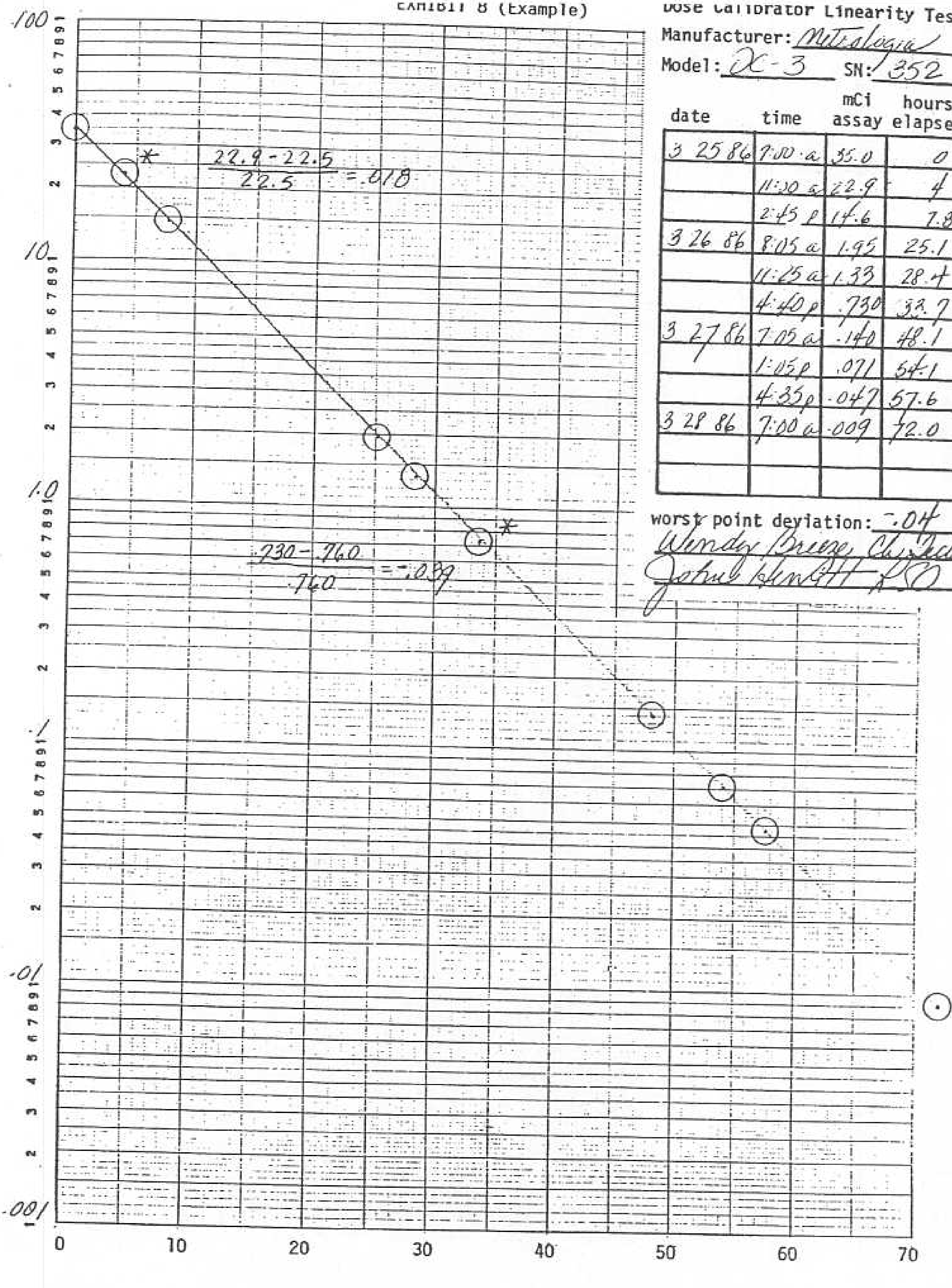
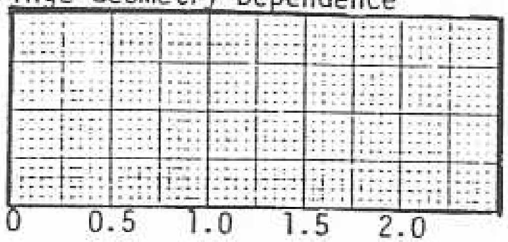


EXHIBIT 9

Dose Calibrator Geometry and Accuracy

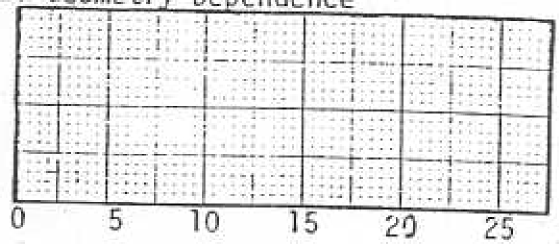
Manufacturer:______________ Model:______________ SN:__________

Syringe Geometry Dependence



____ ____ ____ ____

Vial Geometry Dependence



____ ____ ____ ____ ____ ____ ____ ____

____ ____ ____ ____ ____ ____

Date:__________ By:______________ RSO:______________

Accuracy Sources	19___	19___
______mCi of ______ Model:__________ SN:__________ Calibration date: __________	first assay:______mCi second assay:______mCi third assay:______mCi average:______mCi ______mCi dev:______	first assay:______mCi second assay:______mCi third assay:______mCi average:______mCi ______mCi dev:______
______mCi of ______ Model:__________ SN:__________ Calibration date: __________	first assay:______mCi second assay:______mCi third assay:______mCi average:______mCi ______mCi dev:______	first assay:______mCi second assay:______mCi third assay:______mCi average:______mCi ______mCi dev:______
______mCi of ______ Model:__________ SN:__________ Calibration date: __________	first assay:______mCi second assay:______mCi third assay:______mCi average:______mCi ______mCi dev:______	first assay:______mCi second assay:______mCi third assay:______mCi average:______mCi ______mCi dev:______

Name: ______________ ______________

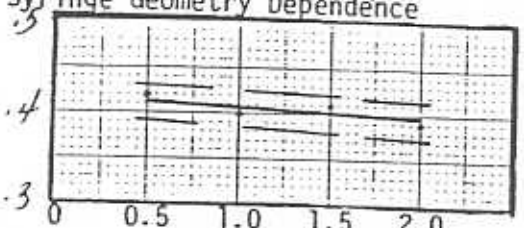
Date: __________ __________

EXHIBIT 9 (Example)

Dose Calibrator Geometry and Accuracy

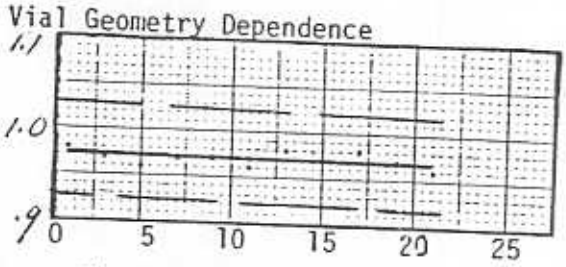
Manufacturer: Metrologica Model: DC-3 SN: 352

Syringe Geometry Dependence



.42 .40 .41 .39

Vial Geometry Dependence



.98 .96 .97 .98 .97 .97 — —
.97 .97 .96 .98 .96 —

Date: 3 29 85 By: Wendy Breeze Ch Tech RSO: J. Hewitt RSO

Accuracy Sources	1985	1986
4.72 mCi of Co-57 Model: S-57-A SN: 407 Calibration date: 1 31 85	first assay: 3.96 mCi second assay: 3.97 mCi third assay: 3.99 mCi average: 3.97 mCi 4.05 mCi dev: -.02	first assay: 1.53 mCi second assay: 1.54 mCi third assay: 1.55 mCi average: 1.54 mCi 1.59 mCi dev: -.03
.103 mCi of Cs-137 Model: S-137-A SN: 407 Calibration date: 1 31 85	first assay: .104 mCi second assay: .105 mCi third assay: .104 mCi average: .104 mCi .103 mCi dev: .01	first assay: .101 mCi second assay: .101 mCi third assay: .101 mCi average: .101 mCi .100 mCi dev: .01
____ mCi of ____ Model: ____ SN: ____ Calibration date: ____	first assay: ____ mCi second assay: ____ mCi third assay: ____ mCi average: ____ mCi ____ mCi dev: ____	first assay: ____ mCi second assay: ____ mCi third assay: ____ mCi average: ____ mCi ____ mCi dev: ____

Name: Wendy Breeze Ch Tech Wendy Breeze Ch Tech

Date: 3 29 85 3 28 86

ok-J Hewitt RSO ok-J Hewitt RSO

EXHIBIT 10

Radioactive Spill Report

The spill occurred at ___:___ am/pm on ___-___-___ room ____.

Instrument used to check for personnel contamination:
Meter model: _____ Meter S/N: _____ Probe model: ____ Probe S/N: _____

Personnel present	Personnel contamination results*
_____	_____
_____	_____
_____	_____
_____	_____

*On the back of the sheet, indicate any personnel decontamination, additional monitoring, or care instituted.

Survey the spill area to identify hot spots, then begin decontamination. When finished, conduct a postcleaning contamination wipe-test.

Radioisotopes present or suspected in the spill:

_____mCi of _____ as _____

_____mCi of _____ as _____

_____mCi of _____ as _____

Give a brief description of the accident: _____

_____

_____

_____

_____

Give a brief description of followup actions taken to prevent recurrence:

_____

_____

_____

Name: _____
Date: _____

EXHIBIT 10 (Example)

Radioactive Spill Report

The spill occurred at 6:50 (am) pm on 5-16-86 in room 450a

Instrument used to check for personnel contamination:
Meter model: 21 Meter S/N: 470 Probe model: 21-B Probe S/N: 319

Personnel present	Personnel contamination results*
Wendy Bruce Ch Tech	< 2000 dpm / 100 cm²
Les Moore Tech	< 2000 dpm / 100 cm²

*On the back of the sheet, indicate any personnel decontamination, additional monitoring, or care instituted.

Instrument used to survey spill area before cleanup: same
Meter model: _____ Meter S/N: _____ Probe model: _____ Probe S/N: _____
Survey the spill area to identify hot spots, then begin decontamination. When finished, conduct a postcleaning contamination wipe-test.

Radioisotopes present or suspected in the spill:
30 mCi of Tc99m as pertechnetate
____ mCi of ____ as _____
____ mCi of ____ as _____

Give a brief description of the accident: Les was removing yesterdays Tc from elg to put into waste area. When transferring vial fr lead brick, it fell from forceps and broke on floor.

Give a brief description of followup actions taken to prevent recurrence: ordered constant tension forceps with friction boots.

Name: John Hewitt RSO
Date: 5 16 86

Radioactive Spill Contamination Survey

The spill occurred at ___:___ am pm on ___-___-___ in room _____. Decontamination completed at ___:___ am pm.

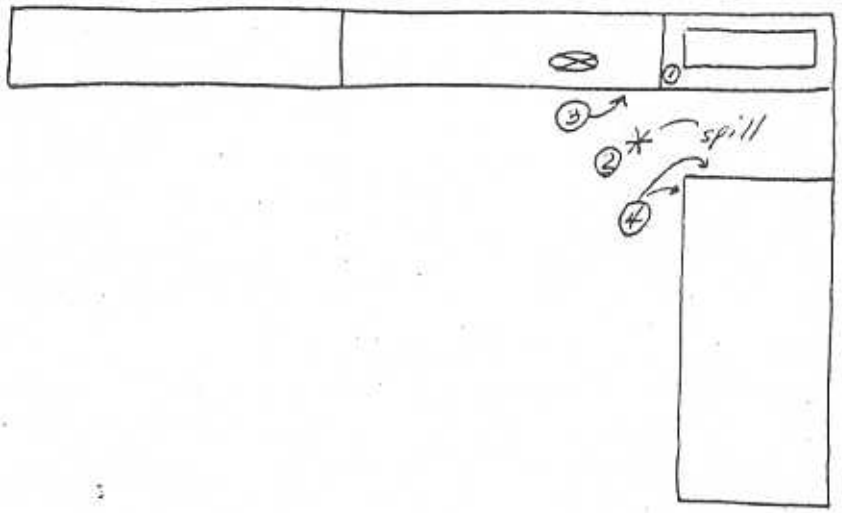
loc	pre-clean mR/hr	post-clean mR/hr	post-clean dpm/100cm^2

Name: _____

EXHIBIT 11

Radioactive Spill Contamination Survey

The spill occurred at 6:50 AM/PM on 5-16-86 in room 4502a. Decontamination completed at 7:10 AM/PM.



loc	pre-clean mR/hr	post-clean mR/hr	post-clean dpm/100cm^2
1	2	0.4	2500
2	500	3.5	23000
3	50	0.5	1500
4	10	0.2	8000

Name: W. Breuze Ch Tech

EXHIBIT 11 (Example)

EXHIBIT 12

PACKAGE RECEIPT AND MONITOR LOG

date received	purchase order no.	packing slip no.	mCi	iso	chemical	supplier	catalogue number	pkg ok?	mR/hr surf	notes	init

EXHIBIT 12 (Example)

PACKAGE RECEIPT AND MONITOR LOG

date received	purchase order no.	packing slip no.	mCi	iso	chemical	supplier	catalogue number	pkg ok?	mR/hr surf	notes	init
3 25 86	8630042	H862064	1000	Mo99	generator	Disintegratus	G-99	ok	170		wb
			2x3	Tl201	thallous chloride		C-201				
3 26 86	8630042	4763804	3x10	Xe133	gas		133-3	ok	9		wb

EXHIBIT 13

UNIT DOSAGE RECEIPT AND USE LOG FOR ______ AS ______________________

date received	supplier	lot	dosage mCi	label time	date dispensed	time	measured mCi	patient	ID number	init

EXHIBIT 13 (Example)

UNIT DOSAGE RECEIPT AND USE LOG FOR ^{99m}Tc AS Medromate

date received	supplier	lot	dosage mCi	label time	date dispensed	time	measured mCi	patient	ID number	init
3 29 86	Lorata	860329M	20	6:15	3 29 86	9:15a	14.2	Mary Smith	S470316	bm
3 30 86	Lorata	860330M	19	8:15	3 30 86	9:10a	17.2	Chris Kross	K521225	bm
			20	8:15	3 30 86	9:20a	18.1	Art Nouveau	N630517	bm

EXHIBIT 14

MULTIDOSE VIAL PREPARATION AND USE LOG FOR ______ AS ____________________

date prepared	time	generator received	kit source	kit lot	mCi/cc	cc	measured mCi	patient	ID number	init

EXHIBIT 14 (Example)

MULTIDOSE VIAL PREPARATION AND USE LOG FOR Tc99m AS Sodium gluceptate

date prepared	time	generator received	kit source	kit lot	mCi/cc	cc	measured mCi	patient	ID number	init
4 14 86	7:05	4 13 86	Scintilla	0863	38	5	190			
	7:45				35	.6	20.0	Matt Frame	717062 9	lms
	8:35				32	.6	19.1	Mae Flower	739129	wb
4 15 86							remainder	waste		
4 15 86	6:50	4 13 86	Scintilla	0863	37	5	185			

EXHIBIT 15

SHORT-LIVED IMPLANT SOURCE LOG

Only the following individuals may handle these sources: ____________________________

____

RSO: ______________________ date: __________

Received on ___________, ______ (no) seeds of ______ (iso) @ ______ (act) mCi each

______ ______ ______

______ ______ ______

date	time	in storage		taken out		returned		patient name	mR/hr	init
		no	mCi	no	mCi	no	mCi			

EXHIBIT 15 (Example)

SHORT-LIVED IMPLANT SOURCE LOG

Only the following individuals may handle these sources: S. Mudd, M.D. SM
Bea Wachen, Therapy Technologist bw John Hewitt, RSO jh

RSO: John Hewitt Date: 5 02 86

Received on 5 02 86, 100 seeds of Ir192 @ 0.5 mCi each (no / iso / act)

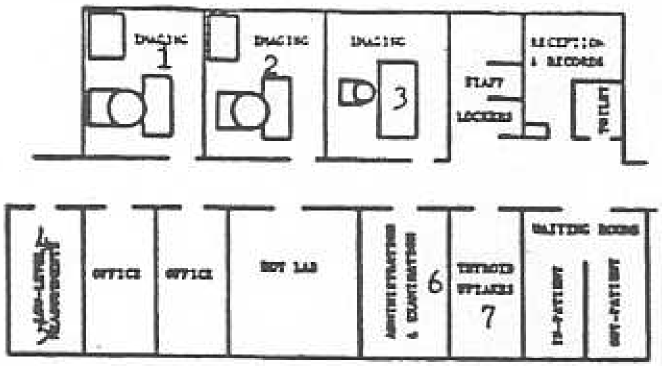
date	time	in storage no	in storage mCi	taken out no	taken out mCi	returned no	returned mCi	patient name	mR/hr	init
5 02 86	3:15 pm	100	50					receipt		jh
5 08 86	10:40 am	50	25	50	25			Windward	10	jh
	11:15 am	60	30	40	20	10	5	Windward		jh
				not needed for implant Tx						
5 09 86	12:15 pm	100	50			40	20	Windward	0.01	jh

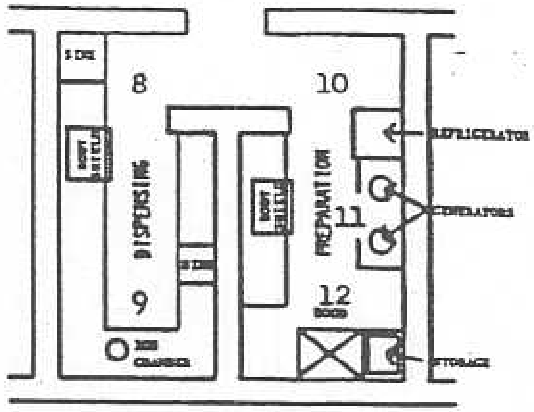
EXHIBIT 16

SAMPLE

Radiation Survey for the month of __________, 19__

Instrument: ________________





EXPANDED VIEW OF HOT LAB

mR/hr at location

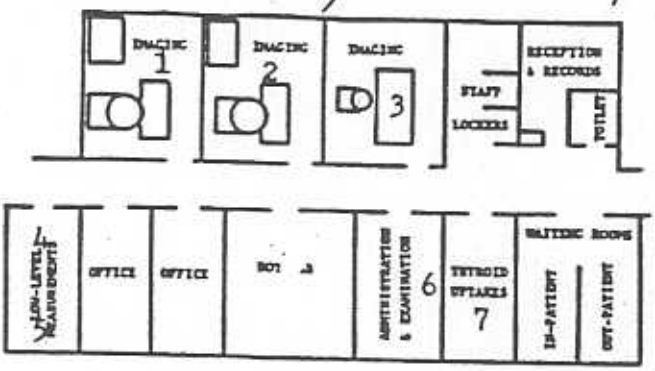
date	1	2	3	4	5	6	7	8	9	10	11	12		init
trigger														

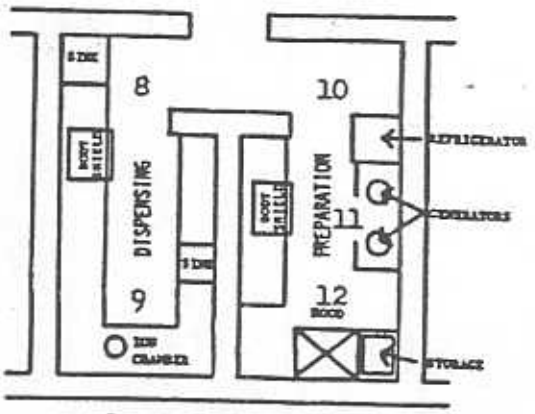
EXHIBIT 16 (Example)

SAMPLE

Radiation Survey for the month of April, 1986

Instrument: Nitralagia 2L SN 470





EXPANDED VIEW OF HOT LAB

mR/hr at location

date	1	2	3	4	5	6	7	8	9	10	11	12		init
trigger	.02	.02	.02	0.1	0.1	.02	.02	0.5	0.5	0.7	1.2	1.0		
1	.02	.01	.01	.05	.05	.02	.02	0.4	0.4	0.6	1.0	0.7		lm
2	.02	.02	.02	.04	.04	.02	.02	0.3	0.4	0.5	0.9	0.7		lm
3	.02	.02	.02	.05	.05	.02	.01	0.3	0.5	0.6	1.0	0.6		lm
4	.01	.01	.01	.04	.04	.01	.01	0.4	0.4	0.5	0.9	0.6		lm
7	(.03)	.02	.02	.06	.06	.02	.02	0.5	0.4	0.7	1.2	0.9		wb
	Hot swab on floor under chair. To waste. .02 mR/hr - wb jh.													

EXHIBIT 17

NURSING INSTRUCTIONS FOR PATIENTS TREATED WITH IODINE-131, PHOSPHORUS-32, OR GOLD-198

Patient Name:_____ Patient Number:_____
Attending:_____Phone:___ Pager:_____ Patient Room:_____

Dose:_____mCi of _____ as _____ was administered at ___:___am pm
Signature:_____ Date:___-___-___

RADIATION EXPOSURE RATES

Unrestricted areas: door-___ ___mR/hr; rm___-____mR/hr; rm___-____mR/hr
Patient supine in bed or _____

Date	Time	Bedside	3 ft from bed	Door	_____
___-___-___	___:___ am pm	_____mR/hr	_____mR/h	_____mR/hr	_____mR/hr
___-___-___	___:___ am pm	_____mR/hr	_____mR/h	_____mR/hr	_____mR/hr
___-___-___	___:___ am pm	_____mR/hr	_____mR/h	_____mR/hr	_____mR/hr
___-___-___	___:___ am pm	_____mR/hr	_____mR/h	_____mR/hr	_____mR/hr
___-___-___	___:___ am pm	_____mR/hr	_____mR/h	_____mR/hr	_____mR/hr
___-___-___	___:___ am pm		_____mR/h		

INSTRUCTIONS

Vistor Restrictions:
- ☐ No visitors.
- ☐ No visitors under 18 or pregnant.
- ☐ ___ minutes each day maximum for each visitor.
- ☐ Visitors must stay behind line on floor at all times.

Nursing Restrictions:
- ☐ Patient is restricted to room.
- ☐ No nurses who are pregnant may render care.
- ☐ ___ minutes each day per nurse in the room.

Patient Care:
- ☐ Wear disposable gloves. Wash your hands after caring for patient.
- ☐ Discard linen, bedclothes, plates, utensils, dressings, etc., in boxes in room.
- ☐ Collect urine in containers provided. Discard feces in toilet.
- ☐ Discard urine and feces in toilet. Flush three times.
- ☐ Housekeeping personnel are not permitted in the room.
- ☐ Only RSO may release room to admitting office.
- ☐ Wear your radiation monitor when caring for patient. Leave at nursing station at the end of your shift. You may use the same monitor on your next shift. Do not share. Call RSO for additional monitors if needed.
- ☐ _____
- ☐ _____

In case of emergency, or if you have a question, call:
RSO:_____ Work:_____ Home:___-___ Pager:_____
MD:_____ Work:_____ Home:___-___ Pager:_____

EXHIBIT 17 (Example)

Nursing Instructions for Patients Treated With Iodine-131, ~~Phosphorus-32, or Gold-198~~

Patient Name: June Weddum Patient Number: W451012
Attending: S. Mudd MD Phone: 5556 Pager: 302 Patient Room: 402E

Dose: 150 mCi of I-131 as sodium iodide was administered at 10:50 (am) pm.

Signature: S. Mudd MD Date: 5-05-86

Radiation Exposure Rates

Unrestricted areas: door-~~402E~~ 0.3 mR/hr; rm ~~402E~~ 0.3 mR/hr; rm ~~403E~~ 0.2 mR/hr
Patient supine in bed on ~

Date	Time	Bedside	3 ft from bed	Door	vis. ch.
5-05-86	11:00 (am) pm	52 mR/hr	22 mR/h	1.8 mR/hr	3.2 mR/hr
5-06-86	10:~~00~~ (am) pm	16 mR/hr	6.7 mR/h	0.6 mR/hr	0.9 mR/hr
__-__-__	__:__ am pm	____ mR/hr	____ mR/h	____ mR/hr	____ mR/hr
__-__-__	__:__ am pm	____ mR/hr	____ mR/h	____ mR/hr	____ mR/hr
5-07-86	11:~~00~~ (am) pm	discharge	4.7 mR/h		

Instructions

Visitor Restrictions:
- o No visitors.
- ✓ No visitors under 18 or pregnant.
- ✓ 30 minutes each day maximum for each visitor.
- ✓ Visitors must stay behind line on floor at all times.

Nursing Restrictions:
- ✓ Patient is restricted to room.
- ✓ No nurses who are pregnant may render care.
- ✓ 30 minutes each day per nurse in the room.

Patient Care:
- ✓ Wear disposable gloves. Wash your hands after caring for patient.
- ✓ Discard linen, bedclothes, plates, utensils, dressings, etc., in boxes in room.
- o Collect urine in containers provided. Discard feces in toilet.
- ✓ Discard urine and feces in toilet. Flush three times.
- ✓ Housekeeping personnel are not permitted in the room.
- ✓ Only RSO may release room to admitting office.
- ✓ Wear your radiation monitor when caring for patient. Leave at nursing station at the end of your shift. You may use the same monitor on your next shift. Do not share. Call RSO for additional monitors if needed.
- ✓ 17 yo. daughter may visit 10 min ea da. S Mudd ok J Hewitt - RSO
- o

In case of emergency, or if you have a question, call:

RSO: John Hewitt Work:____ Home:___-____ Pager: 369
MD: S. Mudd Work:____ Home:___-____ Pager: 302

EXHIBIT 18

RADIATION SAFETY CHECKLIST FOR IODINE THERAPY OVER 30 MILLICURIES

Patient:_____ Room:_____ Date:_____

PREPARATION

- ☐ Schedule a private room, with private sanitary facilities and without carpet, in a low traffic area.
- ☐ Cover large room surfaces with absorbent paper and small surfaces with absorbent paper or plastic bags.
- ☐ Prepare labeled boxes for used linen, disposable waste, and nondisposable contaminanted items.
- ☐ Prepare urine collection containers if urine will be collected.
- ☐ Stock room with disposable gloves, absorbent paper, and "radioactive waste" labels.
- ☐ Mark a visitors' "safe line" on the floor.
- ☐ Order disposable table service.
- ☐ Notify housekeeping to not clean the room until further notice.
- ☐ Brief the nursing staff on radiation safety measures.
- ☐ Supply the nursing staff with personnel radiation dosimeters.

ADMINISTRATION

- ☐ Clear the room of unneeded personnel.
- ☐ Brief the patient on the clinical procedure.
- ☐ Administer the dosage.
- ☐ Measure dose rates at bedside, 1 meter from bedside, visitors' "safe line," and surrounding hallways and rooms.
- ☐ Post the room with a "Radioactive Materials" sign.

FOLLOWUP

- ☐ Measure the thyroid burden of all personnel who were present for the administration.
- ☐ Pick up waste for decay-in-storage or decontamination.
- ☐ Release the patient.
- ☐ Decontaminate and survey the room. Remove the "Radioactive Materials" sign.
- ☐ Call the Housekeeping Office to clean the room.

RADIATION SAFETY CHECKLIST FOR TEMPORARY IMPLANT THERAPY

Patient:_____ Room:_____ Date:_____

PREPARATION

- ☐ Schedule a private room in a low traffic area.
- ☐ Mark a visitors' "safe line" on the floor.
- ☐ Brief the nursing staff on radiation safety measures.
- ☐ Supply the nursing staff with personnel radiation dosimeters.

IMPLANT

- ☐ Clear the room of unneeded personnel.
- ☐ Brief the patient on the clinical procedure.
- ☐ Insert the implant
- ☐ Measure dose rates at bedside, 1 meter from bedside, visitors' "safe line," and surrounding hallways and rooms.
- ☐ Post the room with a "Radioactive Materials" sign.

FOLLOWUP

- ☐ Make a radiation survey of the patient to assure that all sources have been removed.
- ☐ Count the number of sources removed from the patient to assure that all sources have been removed.
- ☐ Remove the "Radioactive Materials" sign.

EXHIBIT 20

NURSING INSTRUCTIONS FOR PATIENTS TREATED WITH TEMPORARY IMPLANT SOURCES

Patient Name:_____ Patient Number:_____
Attending:_____ Phone:_____ Pager:_____ Patient Room:_____
Dose:_____mCi of _____ as _____ individual sources was loaded on __-__-__.
Sources will be removed at approximately __:__ am pm on __-__-__.

RADIATION EXPOSURE RATES

Unrestricted areas: door-_____mR/hr; rm__-____mR/hr; rm__-_____mR/hr
Patient supine in bed or _____

Date	Time	Bedside	3 ft from bed	Door _____
__-__-__	__:__ am pm	_____mR/hr	_____mr/h	_____mR/hr _____mR/hr

Release certification: Patient may not be released from the hospital until the following certification is signed and dated by the RSO or the attending physician.

I have removed and counted ____ individual sources from this patient. A low-range GM survey of the patient failed to indicate any remaining sources in the patient.

Signature:_____ Date__-__-__

INSTRUCTIONS

Visitor Restrictions:
- ☐ No visitors under 18 or pregnant.
- ☐ ___ minutes each day maximum for each visitor.
- ☐ Visitors must stay behind line on floor at all times.

Nursing Restrictions:
- ☐ Patient is restricted to room.
- ☐ Patient is restricted to bed.
- ☐ Patient must not move.
- ☐ No nurses who are pregnant may render care.
- ☐ ___ minutes each day per nurse in the room.

Patient Care:
- ☐ Wear your radiation monitor when caring for patient. Leave at nursing station at the end of your shift. You may use the same monitor on your next shift. Do not share. Call RSO for additional monitors if needed.
- ☐ If a source appears dislodged, call the attending physician and the RSO immediately.
- ☐ Omit bed bath.
- ☐ No perineal care. Pad may be changed as necessary.
- ☐ Save surgical dressings for disposal by attending physician or RSO.
- ☐ See special oral hygiene care instructions.
- ☐ _____
- ☐ _____

In case of emergency, or if you have a question, call:
RSO:_____ Work:_____ Home:___-____ Pager:_____
MD:_____ Work:_____ Home:___-____ Pager:_____

EXHIBIT 20 (Example)

Nursing Instructions for Patients Treated With Temporary Implant Sources

Patient Name: Lee Windward Patient Number: W250101 -

Attending: S. Mudd MD Phone: 5556 Pager: 302 Patient Room: 3015

Dose: 20 mCi of Ir-192 as 40 individual sourc ; was loaded on 5-07-86

Sources will be removed at approximately 11:00 am/pm on 5-09-86.

Radiation Exposure Rates

Unrestricted areas: door- 1.1 mR/hr; rm 3026 0.3 mR/hr; rm 3035 0.2 mR/hr

Patient supine in bed on ~~7~~

Date	Time	Bedside	3 ft from bed	Door	vis. chair
5-07-86	10:50 am/pm	40 mR/hr	10 mR/h	1.1 mR/hr	2.1 mR/hr

Release certification: Patient may not be released from the hospital until the following certification is signed and dated by the RSO or the attending physician.

I have removed and counted 40 individual sources from this patient. A low-range GM survey of the patient failed to indicate any remaining sources in the patient.

Signature: Bea Wacchen Date 5-09-86

Instructions

Visitor Restrictions:
- ✓ No visitors under 18 or pregnant.
- ✓ 30 minutes each day maximum for each visitor.
- ✓ Visitors must stay behind line on floor at all tires.

Nursing Restrictions:
- o Patient is restricted to room.
- ✓ Patient is restricted to bed.
- o Patient must not move.
- ✓ No nurses who are pregnant may render care.
- ✓ 30 minutes each day per nurse in the room.

Patient Care:
- ✓ Wear your radiation monitor when caring for patient. Leave at nursing station at the end of your shift. You may use the same monitor on your next shift. Do not share. Call RSO for additional monitors if needed.
- ✓ If a source appears dislodged, call the attending physician and the RSO immediately.
- o Omit bed bath.
- o No perineal care. Pad may be changed as necessary.
- ✓ Save surgical dressings for disposal by attending physician or RSO.
- ✓ See special oral hygiene care instructions.
- o _____
- o _____

In case of emergency, or if you have a question, call:

2nd RSO: S Mudd M.D Work:____ Home:___-____ Pager: 369

RSO MD: John Hewitt Work:____ Home:___-____ Pager: 302

EXHIBIT 21

SAMPLE CESIUM IMPLANT SOURCE LOG

Only the following individuals may handle these sources: ____________________

____

RSO: ____________________ date: __________

Normal storage configuration			Activity at each storage point					
1A	1B	1C	20mCi:	1A	1B	1C	2A	
2A	2B	2C	10mCi:	2B	2C	3A	3B	3C
3A	3B	3C	15mCi:	4A	4B			
4A	4B	4C	5mCi:	4C				

		in storage		taken out		returned				
date	time	no	mCi	no	mCi	no	mCi	patient name	mR/hr	init

EXHIBIT 21 (Example)

SAMPLE CESIUM IMPLANT SOURCE LOG

Only the following individuals may handle these sources: S. Mudd, M.D. *SMM*
Bea Wacchen, Therapy Technologist *bw* John Hewitt, RSO *jh*

RSO *John Hewitt* date: *1 03 85*

Normal storage configuration

1A 1B 1C
2A 2B 2C
3A 3B 3C
4A 4B 4C

Activity at each storage point

20mCi: 1A 1B 1C 2A
10mCi: 2B 2C 3A 3B 3C
15mCi: 4A 4B
5mCi: 4C

date	time	in storage no	in storage mCi	taken out no	taken out mCi	returned no	returned mCi	patient name	mR/hr	init
1 15 85	*9 am*	*12*	*165*							*jh*
1 22 85	*3:15 pm*	*7*	*95*	*5*	*70*			*Vera Socht*	*15*	*jh*
1 25 85	*2:10 pm*	*12*	*165*			*5*	*70*	*Vera Socht*	*0.01*	*jh*